

# Family physician perspectives on barriers to childhood immunisation

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## Abstract

New Zealand (NZ) has inadequate vaccine coverage and associated disease outbreaks. International research illustrates the importance of provider behaviour in improving vaccine uptake. To understand the immunisation knowledge, views, concerns and educational needs of NZ family physicians, qualitative and quantitative national data was gathered from randomised telephone surveys. Response rate was 60% with respondents' characteristics closely matched to key demographics of NZ family physicians. The most significant barrier to improving immunisation rates identified was parental concern over vaccine safety and associated misconceptions. The second major barrier identified was lack of funding to health providers. A clear need for improvement in family physician knowledge of contraindications to vaccines was highlighted. Family physicians expressed a need for better resources to more effectively address parental fears and misconceptions. Strategies to address these issues include an increased focus on family physician educational needs, extra resources to assist with more effective communication to parents and a review of the present funding of providers for immunisation services.

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## 1. Introduction

New Zealand (NZ) has benefited less from the improvements to population health made possible by immunisation than many other countries. Primarily this results from low immunisation coverage. In 1998 UNICEF data indicated that 102 of the 193 listed countries had higher immunisation rates for the primary infant series than NZ [1]. For immunisation programmes to be fully effective they must maintain high coverage levels, for example elimination of measles in a population requires a coverage rate of at least 95% [2]. The NZ Ministry of Health has set 95% coverage by 2 years of age as the national target [3]. NZ is responding to the current low coverage with the development of an immunisation register to track children's immunisation status, and increasing availability of outreach services. Also implemented has been a national immunisation hotline providing advice to both public and health professionals. Until the register implementation is complete the only accurate national coverage data is provided by the 1992 national coverage survey,

which found that less than 60% of children were fully immunised by age two years [4]. Of further concern, only 45% of Maori and 53% of Pacific Island children were fully immunised. A repeat coverage survey in 1996 in the northern region found minimal improvement, with 63% of children fully immunised at 2 years [5]. There has been no apparent improvement in coverage since then [6].

In contrast, immunisation coverage has improved substantially in both Australia and the United States in recent years. This improvement is the result of multifaceted approaches [7,8]. An integral component of the improved coverage in both of these nations has been the increased emphasis on communicating vaccine safety issues.

International research has clearly identified health provider knowledge about immunisation as an important factor in vaccine uptake [9–11]. There are likely many reasons for this including effective risk-benefit communication [12].

NZ has an active anti-immunisation lobby [13] and local evidence suggests that despite efforts to better communicate immunisation messages to the public, the activities of the lobby group contribute to the eroding of public confidence [14].

Recent studies have indicated that many NZ parents have low confidence in immunisation and their concerns are

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primarily in regard to vaccine safety [15]. Of major significance is that this current lack of confidence is strong enough that it may in itself be sufficient to prevent achieving the 95% target uptake rate [16].

The immunisation programme for NZ infants is delivered within the general practice setting. Over the past decade practising obstetrics has become less viable for general practice obstetricians, and their role has been taken over by midwives and specialist obstetricians. As the majority of antenatal care now is usually provided outside of general practice, there is less opportunity both before the birth of a child and shortly after for family physicians to discuss immunisation with parents. Providers of primary care have a unique opportunity to educate parents because parents see them as the most important source of information about immunisation [17].

The intent of this study was to understand the immunisation issues confronting family physicians in NZ using a national randomised computer-assisted telephone survey. The questions focussed on general practice organisation issues; family physician perceptions of barriers to improving immunisation; family physician knowledge and educational needs regarding immunisation; preferred resources, and their own practices around immunisation.

## 2. Methods

This study used a triangulation, multi-method investigation to understand immunisation issues confronting GPs by converging both quantitative and qualitative text data.

### 2.1. Sample population

The study was carried out in Auckland, NZ between July 2002 and January 2003. The subjects were family physicians practising throughout NZ. The inclusion criterion was any doctor working at the practice either part or full-time. Doctors working in locum tenure positions were excluded. A randomised list of 1283 national general practices was obtained from a commercial vendor and allocated to the interviewers. This source is the most comprehensive and reliably updated database available to NZ researchers. All practices carrying out childhood immunisations were considered eligible. In multi-practitioner settings the interviewers spoke to the first practitioner available.

The sample size of 150 is justified by sample size calculation using EpiInfo 2000. For a population of approximately 3000 (total number of NZ Family Physicians) with an expected frequency of 53% who would know that egg allergy is not a contraindication to MMR vaccination (based on international literature [9])  $\pm 8\%$ , and to get 95% confidence level, a sample of 142 people is needed. The precision of the estimate was assessed by using standard error and 95% confidence interval, which is acceptably small ( $\pm 8\%$  with a

potential of further reduction for situations where expected frequency is lower than 47%).

The study had University of Auckland Human Ethics Committee approval.

### 2.2. Questionnaire design

The design of the questionnaire was based on areas identified in the medical literature as barriers to immunisation. It also explored the educational needs and preferred sources for immunisation information.

### 2.3. Telephone interviews

Interviewing was facilitated by a computer assisted telephone survey tool that managed the sample and questions. The interview lasted about 20 min. Answers were entered directly into the database for collation and analysis. Quantitative responses included yes/no answers; Likert scales, multi-choice options and demographic data including age, gender and nature, duration in, and location of, practice.

Qualitative data involved free-form answers to questions including other perceived barriers to immunisation; sources of information about immunisation and services provided by the family physician regarding immunisation.

### 2.4. Data analysis

Quantitative data analysis was conducted using EpiInfo 2000 where differences between groups were sought.

Cross tabulations were carried out to determine differences between age groups; years in practice; urban versus rural and responses to some of the key areas.

The free-form data responses were analysed using a general inductive approach. Individual text responses were initially analysed to identify sub-themes. The data was then collated and analysed for emerging categories. These were combined into major themes through ongoing discussions and re-reading of the data by the first two authors until consensus was reached regarding the main themes being expressed. The data were independently double-coded as a consistency check and discrepancies resolved by adjudication. These responses were collated and analysed to identify themes, which were combined through discussions between two of the researchers until consensus was reached.

## 3. Results

### 3.1. Response rate

A total of 250 randomly selected practices were contacted to reach a sample of 150 participants (60% response rate). Of the 100 non-responders, 23 (9%) Family Physicians contacted refused to participate; 12 (5%) were initially willing

to take part but decided they were too busy after call-backs; 25 (10%) receptionists refused to put the call through to the family physician; 23 (9%) did not qualify (for example, sports medicine clinics), and 17 (7%) were lost to follow-up (failure to call back before the end of survey).

Of the 150 family physician participants, 111 (74%) were male; 123 (82%) worked full-time ( $\geq 8/10$ ); 51 (34%) worked as sole family physicians; 35 (23%) were from rural settings; and 122 (81%) had been practising 10 or more years, with 46 (31%)  $> 20$  years. The majority, 119 (79%), were aged 40 years or older, with 78 (52%) in the 40 to 49 year age bracket. The average age was 44 years, the same as that of the family physician population nationally. In general these demographic characteristics are similar to those of the Royal New Zealand College of General Practitioners membership documented in 2001 from 1996 and 2000 data [18] in terms of age and years in practice. Our sample was matched for the main city centres Auckland (33%), Wellington (7.3%) and Christchurch (9.3%). However it had a greater representation of rural participants than the national practitioner population (23% compared to 15% [19]). Although we had a larger representation of male over female practitioners compared to the actual practitioner population (74% male compared to 64% nationally) there were no significant inter-gender differences in responses to several key questions.

### 3.2. Barriers to immunisation

Family physicians' responses to a list of possible barriers to immunisation are presented in Table 1. The greatest barrier perceived by family physicians was parents' fear of vaccinations (53%), followed by lack of funding for providers (44%). Only 13% identified difficulty in patient access as a significant barrier.

The view that lack of knowledge in health professionals was a barrier to immunisation was more likely held by participants under 40 years ( $\chi^2 = 6.54$  1df  $P = 0.001$ ). Urban rather than rural family physicians were more likely to see patient difficulty in accessing services as a barrier ( $\chi^2 = 9.84$  1 df  $P \leq 0.002$ ). In view of longer travelling times, remoteness and lower ratio of physician to patient in rural areas this was a surprising finding.

The participants then were asked about other barriers to immunisation that were not covered in the list. The strongest

theme to emerge was misinformation. Comments centred on the misinformation about immunisation distributed by both midwives and the anti-immunisation lobby groups. Family physicians re-emphasised patients' fear of vaccinations due to this misinformation. They also identified a lack of resources, both to inform themselves and also in formats to help educate patients and counter the misinformation. Another strong theme was the lack of opportunity to vaccinate because of a mobile population base, or because they no longer had ready access to their women patients antenatally or in the early post-natal period. Structural issues such as changing schedules, cold chain, lack of patient registration were a concern, and some family physicians felt that there was an apathy on the part of their patients towards vaccination, particularly because some of the diseases are no longer witnessed by the community.

### 3.3. Practitioner knowledge

As international literature has shown that the knowledge of health professionals, especially of contraindications, is the single most important factor in immunisation uptake we asked participants questions about what they considered were contraindications to MMR and pertussis immunisation (Table 2).

Urban rather than rural family physicians were more likely to know that a rash in response to eating eggs is not a contraindication to MMR vaccination ( $\chi^2 = 11.21$ , 1 df,  $P = 0.0008$ ). A desire for further knowledge about vaccine side effects was more likely in those who had been practising less than 10 years ( $\chi^2 = 4.5$  1 df  $P \leq 0.05$ ). Participants under 40 and those who had been in practice for less than 10 years were more likely to view parental fear of vaccination as a barrier ( $\chi^2 = 7.26$  1 df  $P = 0.007$  and  $\chi^2 = 5.62$  1 df  $P = 0.018$ , respectively).

Participants were also asked whether they considered 6 weeks to be too young for babies to receive immunisations. Nearly 5% felt this to be so and a further 6% considered sometimes 6 weeks was too young. Of these 16 responses, six thought 8 weeks would be preferable; four thought 10 weeks and six thought 12 weeks would be a more suitable minimum age.

Resources participants were most likely to refer to for further information regarding immunisation were the latest copy of the Ministry of Health Immunisation Handbook

Table 1  
Family physicians' perceived barriers to improving immunisation  $N = 150$

| Barrier                                      | Agree (%) (n) | Neither agree nor disagree (%) (n) | Disagree (%) (n) |
|----------------------------------------------|---------------|------------------------------------|------------------|
| Parental fear regarding immunisation         | 53 (80)       | 21 (32)                            | 27 (41)          |
| Lack of funding for providers                | 44 (66)       | 15 (23)                            | 41 (62)          |
| Lack of time for providers to offer services | 28 (42)       | 13 (20)                            | 59 (89)          |
| Poor Ministry direction                      | 27 (41)       | 23 (35)                            | 49 (74)          |
| Patient difficulties accessing services      | 13 (20)       | 14 (21)                            | 73 (110)         |
| Lack of interest in the topic by providers   | 11 (17)       | 13 (20)                            | 75 (113)         |
| Lack of knowledge in health professionals    | 8 (12)        | 11 (17)                            | 81 (122)         |

Table 2  
Results for perceived contraindications to MMR and pertussis vaccinations  
(*N* = 150)

|                                                                           | Correct answer<br>rate (%) ( <i>n</i> ) |
|---------------------------------------------------------------------------|-----------------------------------------|
| Perceived contraindication to MMR vaccination                             |                                         |
| Baby gets a rash eating eggs <sup>b</sup>                                 | 36 (54)                                 |
| Baby has spina bifida and hydrocephalus <sup>b</sup>                      | 48 (72)                                 |
| Baby being treated for leukaemia <sup>a</sup> (actual contraindication)   | 56 (84)                                 |
| Mother pregnant <sup>b</sup>                                              | 66 (99)                                 |
| Baby had a febrile convulsion at 11 months <sup>b</sup>                   | 73 (110)                                |
| Baby with snuffly cold/nasal discharge <sup>b</sup>                       | 79 (119)                                |
| Sibling has ADHD <sup>c</sup> , Autism or Aspergers <sup>b</sup>          | 81 (122)                                |
| Mother breastfeeding <sup>b</sup>                                         | 89 (133)                                |
| Baby reported to have had measles <sup>b</sup>                            | 91 (137)                                |
| Baby has eczema <sup>b</sup>                                              | 95 (143)                                |
| History of parental febrile fits <sup>b</sup>                             | 97 (145)                                |
| Perceived contraindication to pertussis vaccination                       |                                         |
| Baby had a HHE <sup>d</sup> following previous immunisations <sup>b</sup> | 6 (9)                                   |
| History of parental febrile fits <sup>b</sup>                             | 97 (14)                                 |
| Screaming for >3 h after previous immunisation <sup>b</sup>               | 39 (58)                                 |
| Baby had apnoea in first 3 weeks <sup>b</sup>                             | 50 (75)                                 |
| Baby has motor delay <sup>a</sup> (actual contraindication)               | 65 (97)                                 |
| Baby has spina bifida, no leg weakness <sup>b</sup>                       | 65 (97)                                 |
| Baby with snuffly cold/nasal discharge <sup>b</sup>                       | 85 (127)                                |
| Older sibling had fever following DTaP <sup>b,e</sup>                     | 94 (141)                                |
| Baby has eczema <sup>b</sup>                                              | 97 (146)                                |
| Sibling has eczema or asthma <sup>b</sup>                                 | 100 (150)                               |

<sup>a</sup> Is a contraindication.

<sup>b</sup> Is not a contraindication.

<sup>c</sup> DTaP: diphtheria, tetanus and acellular pertussis vaccine.

<sup>d</sup> HHE: hypotonic hypo-responsive episode.

<sup>e</sup> ADHD: attention deficit hyperactivity disorder.

(97.3%); their local immunisation coordinator (53.3%); CME (63.3% and colleagues (66%)—usually a practice nurse. Other sources for information were mainly medical journals. Only 47.3% said they were internet users and preferred sites were Ministry of Health, CME websites, CDC and various databases such as Medline. Family physicians were asked if there were additional areas on which they required information. There were 69 respondents to this section. Analysis identified and categorised responses into four themes: updates on own knowledge on diseases and vaccines; patient resources (to counter misinformation, risk versus benefit information, non-English resources); rapid communication on emerging issues such as media responses, and travel information.

#### 4. Discussion

This is the first comprehensive survey of NZ family physicians regarding immunisation—knowledge, attitudes, needs and practices, and their views on patient barriers to immunisation. The sample approximates the NZ family physician population demographics suggesting those who participated

are representative of this population. While the views of family physicians may not reflect issues that lie outside their own experiences, they are the primary health care professionals to whom most members of the population go for primary care.

We have recently studied the knowledge and attitudes of NZ mothers around immunisation and found a pervasive underlying fear of vaccines and perceived side effects [15]. Concerns were present regardless of the vaccination status of their children. Parents who have vaccinated their children held fears as well as those who actively object to vaccination, and this was consistent across socio-economic groups [20]. These findings have not to date been strongly responded to in NZ where strategies focus predominantly on structural barriers to accessing services.

Our findings show that family physicians believe the largest barrier for parents is fear (53%) and that information is a problem, both in terms of misinformation and lack of information. They rated patient difficulties in accessing services as an unlikely barrier to improving immunisation with only 13% totally agreeing with the statement.

The second largest barrier identified by family physicians (44%) was the lack of funding to health providers. Scheduled immunisation for Tetanus, Diphtheria, Pertussis, Polio, Hib, Hepatitis B, Measles, Mumps and Rubella is free to NZ children. The government provides the vaccines to the family physicians and pays an average of \$NZ16.40 per immunisation event. However family physicians need to meet the costs themselves of cold chain requirements and maintaining a recall system. The latter includes software costs, staff time, mailing and telephone costs if the recall is posted. Many family physicians do not believe that the funding provided covers their costs in providing this service, and that compliant costs are a significant issue for them. A 1998 NZ study found that given the frequency of recall reminders, there was a net cost to practices for childhood immunisation, after deducting the benefit rate [21]. A strong argument can be made for better funding the informed consent process, regardless of whether the ultimate outcome is parents agreeing or declining to the vaccination of their children.

Although participants rated their own lack of knowledge as the least likely factor in low immunisation coverage the participants in this study had a poor knowledge of contraindications to two primary vaccines—MMR and Pertussis (Table 2). International literature shows that poor knowledge of immunisation by health professionals, rather than attitudes, is the single biggest factor in vaccine uptake [9,11,22,23]. Interestingly, a minority of family physicians included a desire for further knowledge about the vaccines (32.7%) or knowledge around delivery techniques for vaccines (18.7%) and none included a further need for such information in the freeform answer – “What other areas would you like information about?”. Clearly there is a need to improve family physicians’ knowledge of contra-indications to vaccination in order to decrease the occurrence of missed opportunities.

The views of family physicians support the findings from other studies showing that parental concern over the safety of vaccines is the most significant barrier to immunisation for parents. Practitioners have acknowledged this by ranking the desire for resources to address parent concerns highly and it is imperative that these needs are met.

Primary health care provider commitment to immunisation is a key aspect of improving coverage. There are key issues from these findings to be considered in strategies to improve coverage levels in NZ. Firstly the need for an increased focus on family physician education needs to broaden their knowledge base, particularly in the area of contraindications to vaccination. Secondly, extra resources and strategies to assist with more effective communication and positive support for parents are required. Thirdly a review of the present funding of providers for immunisation services which is seen as a significant barrier to efforts to increase coverage.

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